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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER				
O'HARA, BRIAN M				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/573,570

Applicant(s)

SHEPSHELOVICH ET AL.

Examiner

Brian M. O'Hara

Art Unit

3644

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 October 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/CD)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1 recites the limitation of "said arrangement being free of additional wings or tail arrangement". However, elements 18, 19, and or 20 as shown in Figures 1A-1D appear to be additional wings or tail arrangements. It is unclear what structure is being required and what structure is being excluded from the aircraft arrangement. Element 19, which is not claimed, can be considered to be additional "tail arrangement".

3. Claims 2-29 are rejected for being dependant upon Claim 1.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. **Claims 1-4, 6-22, 25, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Delanne (US Patent 2,147,968 A) in view of Cox et al. (US Patent 6,626,398 B1).** Delanne discloses an aircraft arrangement comprising a fore wing (1) and an aft wing (2) in tandem close-coupled arrangement (See Fig. 2), wherein

said aft wing has side panels (7) and control surfaces (6), and tapered planform with positive sweep (See Fig. 2), said fore wing has non-positive trailing edge sweep (See Fig. 2), the fore wing and aft wing being disposed at different heights (See Figs. 1 and 3), and said arrangement being free of additional wings or tail arrangement. Delanne does not disclose the aircraft arrangement being a micro or mini UAV. Cox et al. teaches an aircraft arrangement which comprises a tandem close-coupled arrangement and is a mini or micro UAV (See Table 1). At the time of invention, it would have been obvious to one of ordinary skill in the art to down size and make autonomous the aircraft arrangement of Delanne in view of the teachings of Cox et al. The motivation for doing so would have been to create an aircraft which can be handled in the battlefield (sizing of Cox et al.) yet has high load carrying capabilities and maneuverability (arrangement of Delanne).

6. With regard to claims 2-4 and 6-7, Delanne discloses: the fore wing having straight trailing edges with negative sweep angle (See Fig. 2); the fore wing having negative sweep (See Fig. 2); a fuselage (3); the fore wing being disposed higher than said aft wing at least by the length of an average aft wing chord (See Fig. 3); and the fore wing and aft wing partially overlap each other (See Fig. 4).

7. With regard to dependant claims 8-9, Delanne discloses a tandem arrangement wherein: the sum of the planform wing areas of said tandem arrangement is at least 70% of the product of $W \times L$ (See Figs. 4 and 6); the forewing, aft wing and other elements are disposed to provide longitudinal aerodynamic stability (See Column 4, Lines 34-34).

8. Regarding Claim 10 Delanne discloses an aircraft wherein at zero lift the aircraft would experience a positive, nose up, pitching moment because of a larger wing planform in the forward position (See Fig. 2) with that fore wing having a non-positive trailing edge sweep.

9. With regard to dependant claims 11 and 12, the fore wing and aft wing have rounded tips (See Fig. 2), at least a portion of the aft wing has negative or positive sweep angle (See element 2 in Fig. 6).

10. With regard to dependant claims 13-15, Delanne discloses the aircraft arrangement wherein: the aft wing (2) has aspect ratio between 2.5 and 4; the fore wing (1) has aspect ratio between 3 and 5; planform areas of the aft wing and the forewing are in ratio between 2:1 and 1:1 (See Fig. 6).

11. With regard to dependant claims 16-19, Delanne discloses an aircraft arrangement wherein: said aft wing has rudder control surfaces (9) on its side panels (7); the fore wing has side panels (8) with rudder control surfaces (7) on its side panels and control surfaces (6).

12. With regard to dependant claim 20, Delanne discloses a tractor propeller (12).

13. With regard to dependant claims 21, 22, and 25, Cox et al. discloses the aircraft arrangement wherein: at least one of said fore wing and aft wing has non-zero dihedral angle (See Table 1); the dihedral angles of the fore wing and of the aft wing are such that the vertical distance between wing tips of said fore wing and said aft wing is greater than the vertical distance between their respective wing roots (See Table 1; -10° anhedral forward wing and -10° dihedral rearward wing); and the aft wing has positive

angle of incidence and section with positive zero lift pitching moment (See Table 1;
angle of attack -2° to $+2^{\circ}$).

14. **Claims 5, and 23, 24, and 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Delanne and Cox et al. as applied to claims 1 and 4 above, and further in view of Fraser (US Patent 3,954,231 A).** Delanne and Cox et al. disclose an aircraft arrangement of a self-propelled Mini or Micro UAV as described above. Fraser teaches a tandem wing aircraft configuration wherein: the fore wing is mounted on the upper side of the fuselage on at least one pylon (See pylons in Fig. 4); the fore wing and aft wing have twist (See separate wing sections in the wings of Fig. 11). With regard to claims 27-29, Fraser teaches a fighter type aircraft (See Fig. 6). It is well known to provide longitudinal aerodynamic instability in these types of aircraft to improve maneuverability. Additionally a pusher propeller is shown in Fig. 10. At the time of invention, it would have been obvious to one of ordinary skill in the art to provide the aircraft arrangement of Delanne and Cox et al. as described above with the pylon, wing twist, and stability characteristics of Fraser. The motivation for doing so would have been to meet the flight requirements with respect to maneuverability and range for the UAV.

15. **Claims 30 and 31 are rejected under 35 U.S.C. 102(b) as anticipated by the Miles Aircraft Libellula M.35 (designed in 1942, See attached articles) or, in the alternative, under 35 U.S.C. 103(a) as obvious over Libellula M.35 in view of Cox et al. (US Patent Application Publication 2003/0155463 A1).** The Libellula M.35 design discloses an aircraft arrangement of self-propelled Mini or Micro UAV comprising

a fore wing and an aft wing in tandem (same wing span) close-coupled (top view shows them close together) arrangement, wherein said aft wing has side panels and control surfaces, and tapered planform with positive sweep, said fore wing has non-positive trailing edge sweep, the fore wing and aft wing being disposed at different heights (forewing is higher), and said arrangement being free of additional wings or tail arrangement (only has vertical stabilizers on aft wing), and wherein a planform area of the aft wing is not less than a planform area of the fore wing. If applicant does not agree that the Libellula M.35 design discloses an arrangement which can be applied to a self-propelled mini or micro UAV (many aircraft are miniaturized as RC toys); Cox et al. discloses the use of a tandem wing (308) design for a mini or micro UAV (300; Box 100 is 40 in., approx 1 m long; See Paragraph [0012] and Figs. 2A-2C). At the time of invention, it would have been obvious to one of ordinary skill in the art to place the aircraft arrangement of the Libellula M.35 design on a mini or Micro UAV in view of the teaching of Cox et al. The motivation for doing so would have been to provide a lightweight stable reconnaissance vehicle.

16. Regarding Claim 31, the Libellula M.35 design discloses an aircraft arrangement wherein the planform areas of the aft wing and the fore wing are in ratio between 2:1 and 1:1 (Figures show the aft wing to be larger).

Response to Arguments

17. Applicant's arguments filed 10/26/2009 have been fully considered but they are not persuasive.

18. Regarding Applicant's Arguments on Page 8 Line 4 – Page 9 Line 1: applicant states that elements 18, 19 and 20 are included in claim 1 as part of the aft wing.

Contrary to applicant's position, Claim 1 does not include the limitation of rudder control surfaces which are element 19. Since Element 19 can be considered to be an additional "tail arrangement" and it has not been positively recited in Claim 1, the drawings and specification are contradictory to the claim of "said arrangement being free of additional wings or tail arrangement." The control surfaces listed in Claim 1 are on the aft wing and not part of the side panels.

19. Regarding applicants' arguments in the Overview section on Pages 11-13 Applicants discuss differences in sizing considerations for aircraft. This discussion is not commensurate with the scope of the claims since specific sizes, Reynolds numbers, and airspeeds are not being claimed. Even though applicants' preamble of the claims is "an aircraft arrangement of self-propelled Mini or Micro UAV", the body of the claim does not require any size limitations or propelling device, i.e. motor. With respect to page 1, lines 15-17, "Mini-UAV are vehicles of about 20 cm to 1.2 m size while Micro-UAV are limited to 6 inches (15 cm) in either dimension, according to the definition of Defense Advanced Research Project Agency (DARPA) of the USA". These are not considered a specific definition, since the ranges of the sizes is only an approximation (about) and how the "size" is measured is undefined. Is the size the height of the aircraft, the length of the wings, the length from front to back, etc?

20. Regarding Applicant's Arguments on Page 14 Line 5 – Page 15 Line 6 (Section 1): applicant states that the examiner has failed to provide a motivation to consider Cox

et al. and there is no motivation whatsoever to combine Delanne and Cox et al. These arguments are not commensurate with the rejection as set forth in the Office Action dated 04/29/2009. As clearly set forth in the rejection, Cox et al. is used to teach a smaller size which has been applied to the arrangement of Delanne while still maintaining the arrangement of Delanne. The assertion that the motivational statement starts with Cox et al. and then turns to Delanne is not correct. The later portion of the motivational statement ("*yet has high load carrying capabilities and maneuverability (arrangement of Delanne).*") has been provided to clarify that the arrangement of Delanne is being maintained while being downsized.

21. Regarding Applicant's Arguments on Page 15 Line 7 – Page 17 Line 9 (Section 2): applicant states that it would not be obvious combine Delanne with the T-type tail design of Cox et al. The Examiner agrees with the position of the applicant that it would not be obvious to add the T-type tail or conventional tail of Cox et al. to Delanne. However, this argument is not seen to be commensurate with the rejection as set forth in the Office Action dated 04/29/2009. The Cox et al. reference is being used to teach the size of the aircraft and not the arrangement of the wings or control surfaces.

22. Regarding Applicant's Arguments on Page 17 Lines 10-15 (Section 3): In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include

knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

23. Regarding Applicant's Arguments on Page 17 Line 16 – Page 19 Line 16 (Section 4): applicant states that Cox et al. does not disclose a micro or mini UAV. These arguments are not seen to be commensurate with the scope of the claims. Claim 1 recites the limitation of "An aircraft arrangement of self-propelled Mini or Micro UAV". Claim 1 therefore does not require an aircraft that is a Mini or Micro UAV, only an arrangement which is suitable for use on a Mini or Micro UAV. Further, the arrangement of Delanne is applicable for use on a Mini or Micro UAV and therefore the combination as set forth above meets the limitation of the claims. Applicant also argues that the size of the aircraft of Cox et al. is too large to be considered a Mini or Micro UAV. The applicant's specification states that: "Mini-UAV are vehicles of about 20 cm to 1.2 m" and as stated in the arguments section "Mini-UAV are considered to include vehicles of about 20 cm to 1.2 m size". The examiner agrees that Miniature UAVs include vehicles of about 20 cm to 1.2 m; however the term Mini-UAV does not preclude UAVs which are of the size of the Cox et al. reference. Cox et al. teaches a UAV which is meant to be deployed in the battlefield and thus is sized to be transportable in such an environment. An aircraft sized according to Cox et al. for use as taught by Cox et al. is a Mini-UAV.

Conclusion

24. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian M. O'Hara whose telephone number is (571)270-5224. The examiner can normally be reached on Monday thru Friday 10am - 5pm except the first Friday of every Bi-week.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael R. Mansen can be reached on (571)272-6608. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael R Mansen/
Supervisory Patent Examiner, Art Unit 3644

/B. M. O./
Examiner, Art Unit 3644